

# Simultaneous Laparoscopic Anterior Resection and Left Hepatic Lobectomy for Stage IV Rectal Cancer

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## ABSTRACT

We report the case of a 68-year-old female patient affected by rectal cancer and a synchronous metastatic lesion measuring 8cm in diameter in the left hepatic lobe. After a laparoscopic ultrasonography exploration of the liver to detect possible occult metastases, a simultaneous colorectal resection and a left hepatic lobectomy including a partial resection of segment IV were performed. Five ports were used for the entire procedure. The resected specimens were extracted through a Pfannenstiel incision. The procedure was completed laparoscopically. Total operative time was 455 minutes with negligible intraoperative blood loss. The postoperative hospital stay was 12 days. At 4-month follow-up, the patient recovered completely. A computed tomography scan performed at this time showed no signs of recurrent disease. This report confirms the feasibility of the laparoscopic approach to simultaneous hepatic and colorectal resections in stage IV rectal cancer. The known advantages of the minimally-invasive approach could make such complex procedures more endurable.

**Key Words:** Laparoscopy, Laparoscopic hepatectomy, Liver resection, Rectal cancer, Colorectal resection.

## INTRODUCTION

During the natural history of colorectal cancer, about 50% of patients develop hepatic metastases and, of these, 15% to 50% have synchronous disease.<sup>1-4</sup> To date, treatment of stage IV colorectal cancer is still controversial, but in select patients a simultaneous resection of primary colorectal tumor and liver metastases can be safely performed, even if major liver resection is required or in the presence of rectal cancer.<sup>5-7</sup>

Although the laparoscopic approach to abdominal malignancies has been initially accepted with scepticism, it has become increasingly used in select patients who have either colorectal or liver cancer, with oncological radicality comparable to that of conventional open procedures.<sup>8,9</sup> Despite increasing laparoscopic indications for both colorectal and liver resections, laparoscopic combined procedures in primary colorectal cancer with synchronous liver metastases have rarely been performed. We present such a case.

## CASE REPORT

A 68-year-old woman presented with body weight loss, constipation, and abdominal pain. Her medical history revealed neither relevant diseases nor abdominal surgery. An ultrasonography detected a lesion almost entirely involving the left hepatic lobe. A thoracoabdominal computed tomography (CT) scan showed a large hepatic lesion 8cm in diameter that displaced the left branch of the portal vein without any detectable infiltration (**Figure 1**).

In addition, thickening of the pelvic colon wall was detected. A colonoscopy with biopsy revealed a circumferential stenosing adenocarcinoma extending from 12cm to 15cm from the anal verge. A bone scintigraphy was negative. Liver function tests were normal, and preoperative CEA level was 13 $\mu$ g/L.

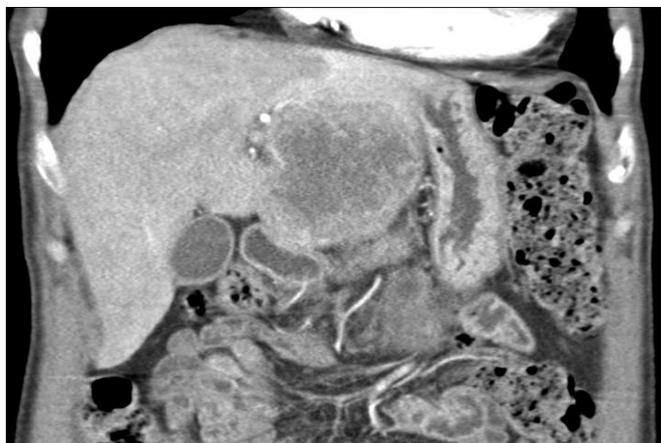
A laparoscopic combined resection of primary colorectal cancer and liver metastasis, if confirmed as a solitary lesion by laparoscopic ultrasound (LUS) exploration, was planned.

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**Figure 1.** Liver CT showed a large hepatic metastasis, involving Couinaud's segments II and III. Left branch of the portal vein appeared to be displaced but not infiltrated by the tumor.

### Operative Procedure

The operation was performed by 2 senior surgeons highly experienced in hepatobiliary and laparoscopic surgery.

Liver resection was performed first. While the patient was under general anesthesia, she was placed in a supine position with a reverse Trendelenburg tilt and legs apart. Positioning of trocars is shown in **Figure 2**. The pneumoperitoneum was created with an "open" technique at the umbilicus, and a 12-mm trocar (A) was placed for the camera.

Two 10-mm trocars were positioned in the right and left midclavicular line at the umbilicus level (B and C respectively), one 5-mm trocar in the epigastrium (D) and a 10-mm trocar in the right iliac region (E).

Trocars A to D were used for the hepatic resection, whereas trocar E was added at the time of the bowel resection.

At the beginning of the procedure, the surgeon stood between the patient's legs using trocars B and C.

At the intraabdominal exploration, no extrahepatic disease was detected, and the feasibility of colon resection with a laparoscopic approach was verified. LUS exploration of the liver was carried out to confirm the resectability and to detect possible occult metastases.

The lesion in the left hepatic lobe was localized, and an additional 2-cm lesion involving segment IV was identified. Therefore, a left lobectomy including part of segment IV was planned.



**Figure 2.** Port placement for combined procedure.

Hepatic transection was performed using a radiofrequency dissector (Ligasure Vessel Sealing System; Covidien Italia, Segrate(Mi), Italy) so as to expose the upper surface of the segment 2 and 3 pedicles intrahepatically. After detection by LUS, the portal pedicles were divided using a vascular stapler (Endo-GIA; Covidien Italia, Segrate (Mi), Italy), with traction on the round ligament up and to the right. The parenchymal transection was then completed with the radiofrequency dissector to expose the left hepatic vein intrahepatically, which was divided with a stapler. A Pringle maneuver was not necessary. Two fibrinogen-coated collagen patches (TachoSil; Nycomed Italy, Milano, Italy) were left on the resection surface.

The specimen was put in a sterile bag and left under the diaphragm for later retrieval.

Next, the patient was placed in a Trendelenburg position with a right tilt for the colorectal resection. The monitor was shifted close to the patient's left leg, and the surgeon moved to the patient's right, using trocars B and E during the dissection of the rectosigmoid and trocars C and D to mobilize a highly positioned splenic flexure.

A typical laparoscopic anterior resection with a medial approach to the inferior mesenteric vessels was realized.

The resected liver specimen and the proximal colon were extracted through a Pfannenstiel incision and a wound protector (**Figure 3**). Then, the colorectal anastomosis was completed intracorporeally with a transanal circular stapler.

Two drainage tubes, in the upper and lower abdomen, were left.



**Figure 3.** Liver specimen revealing the 8-cm metastatic lesion in left hepatic lobe.

Total operative time was 455 minutes with negligible intraoperative blood loss. Oral feeding was resumed on postoperative day 4. There were no postoperative complications, except for a prolonged serosal output from the abdominal drainage. The postoperative hospital stay was 12 days.

Pathology examination revealed a pT3/G2/pN2 adenocarcinoma of the upper rectum. Thirty-one lymph nodes were sampled and 8 were metastatic. Proximal, distal, and circumferential resection margins were negative. The secondary nature of the hepatic lesion and its satellite were confirmed on the liver specimen that measured 15 x 12 x 6.5cm. The resection margins were free.

The patient was referred to the oncologist for 6-month XELOX adjuvant therapy. At 4-month follow-up, the patient had recovered completely. A computed tomography scan performed at this time showed no signs of recurrent disease.

## DISCUSSION

A recent population-based study of the period from 1976 to 2000 reported an incidence of synchronous colorectal liver metastases of 14.5%.<sup>4</sup>

The optimal strategy for resectable hepatic lesions is still not well defined, but a general tendency towards extending the criteria for synchronous resections over time is noted.

All studies comparing simultaneous and staged resection of the primary colorectal cancer and synchronous liver metastases have a bias, because synchronous resections are per-

formed in patients who more often had right-sided colonic operations, fewer, smaller, and uni-lobar metastases and as a result of this, more often had comparably minor hepatic resections compared with staged resections.<sup>5-7</sup>

A literature review by Hillingsø et al<sup>10</sup> reports that in resectable stage IV colorectal cancer, simultaneous resections range from 22% to 36% compared with delayed resections. Similar results have been reported when the rectum is considered the primary site of the disease.

Reports on laparoscopic-associated hepatic and colorectal resections are sporadic.<sup>11-17</sup>

In fact, they are often included as associate procedures in large series of laparoscopic liver or colic resections in which details of the combined technique and their specific results are not reported.

Except for one case reported by Inagaki et al<sup>11</sup> of left hemihepatectomy combined with right hemicolectomy for liver cystadenoma and diverticulosis, the other reports describe a laparoscopic approach to stage IV colorectal cancer.

To date, the laparoscopic technique of combined hepatic and colorectal resection is not standardized. Two initial experiences describe a laparoscopic-assisted approach to stage IV colorectal cancer. Bretagnol et al<sup>14</sup> reported a series of 10 patients, and among these only 3 underwent a totally laparoscopic combined resection.

Kim et al<sup>15</sup> used a hybrid procedure: in their series a totally laparoscopic procedure was performed only for colorectal surgery; liver resection was performed using the open technique, limiting hand-assisted laparoscopic surgery to minor liver resection and liver mobilization.

In our case, we performed a totally laparoscopic procedure with extraction of the liver and colon specimen through the same suprapubic incision. Only 4 trocars were used for the hepatic resection. This placement was also useful for the colorectal resection, with the addition of only one trocar. This is in our opinion the best placement in such a combined procedure.

First, the camera port placed at the umbilicus provided optimal visualization of both the colorectal and liver fields.

Second, the positioning of the epigastric trocar was useful for both the liver and splenic flexure mobilization.

Third, trocars in the right and left flank were used both as operating and retracting trocars during both the rectosigmoid and liver resection. Finally, no repositioning of the patient was required between the hepatic and the bowel resection. In fact, the supine position with legs apart was

useful both for the surgeon in the first part of the procedure and for transanal colorectal anastomosis in the next part of the operation.

One major concern about the hepatic resection was mobilization of the left hepatic lobe due to the dimensions of the tumoral mass. Even when the anatomical “handles” of the liver such as the left coronary and round ligaments are used to obtain a better exposition, tumoral size could represent a real obstacle to correct visualization of the vascular pedicles and the left hepatic vein.

In fact, this part of the procedure was really time-consuming, representing the longest part of the whole procedure. Our operating time of 455 minutes compares favorably with times reported in the literature,<sup>14–15</sup> but it may be considered long even if improvable with increasing experience in combined procedures.

To date, no dimensional “cut-off” limits have been reported in the literature. The increasing number of laparoscopic major hepatic resections being performed bear witness to the technical possibility even if this problem is often encountered and described.<sup>17</sup>

With the open technique, at least a xiphopubic incision is needed. A laparoscopic approach should minimize the abdominal wound and consequently reduce postoperative pain, demand for analgesia, and the incidence of incisional hernia. Concerning the hospital stay, our result was similar to those reported in the literature.<sup>14,16</sup> Furthermore, even if the laparoscopic approach gives similar results as the open approach when simultaneous resections are compared, laparoscopy is significantly superior in staged resections,<sup>5,6,10</sup> confirming that the benefit of laparoscopy becomes more evident when the procedures are associated.

## CONCLUSION

Given its safety in both colorectal and liver surgery, the laparoscopic approach could make complex operations like simultaneous resection in stage IV colorectal cancer more endurable.

## References:

1. Fong Y, Fortner J, Sun RL, et al. Clinical score for predicting recurrence after hepatic resection for metastatic colorectal cancer: analysis of 1001 consecutive cases. *Ann Surg.* 1999;230:309–318.
2. Bolton JS, Fuhrman GM. Survival after resection of multiple bilobar hepatic metastases from colorectal carcinoma. *Ann Surg.* 2000;23:743–751.

3. Choti MA, Sitzmann JV, Tiburi MF, et al. Trends in long-term survival following liver resection for hepatic colorectal metastases. *Ann Surg.* 2002;235:759–766.
4. Manfredi S, Lepage C, Hatem C, Coatmeur, et al. Epidemiology and management of liver metastases from colorectal cancer. *Ann Surg.* 2006;244:254–259.
5. Martin R, Paty P, Fong Y, et al. Simultaneous liver and colorectal resections are safe for synchronous colorectal liver metastasis. *J Am Coll Surg.* 2003;197:233–241.
6. Capussotti L, Vigano’ L, Ferrero A, et al. Timing of resection of liver metastases synchronous to colorectal tumor: proposal of prognosis-based decisional model. *Ann Surg Oncol.* 2007;14:1143–1150.
7. Reddy SK, Pawlik TM, Zorzi D, et al. Simultaneous resections of colorectal cancer and synchronous liver metastases: a multi-institutional analysis. *Ann Surg Oncol.* 2007;14:3481–3491.
8. Simillis C, Constantinides VA, Tekkis PP, et al. Laparoscopic versus open hepatic resections for benign and malignant neoplasms: a meta-analysis. *Surgery.* 2007;141:203–211.
9. Colon Cancer Laparoscopic or Open Resection Study Group, Buunen M, Veldkamp R, Hop WC, et al. Survival after laparoscopic surgery versus open surgery for colon cancer: long-term outcome of a randomised clinical trial. *Lancet Oncol.* 2009;10:44–52.
10. Hillingsø JG, Wille-Jørgensen P. Staged or simultaneous resection of synchronous liver metastases from colorectal cancer—a systematic review. *Colorectal Dis.* 2009;11:3–10.
11. Inagaki H, Kurokawa T, Sakamoto J, et al. Laparoscopic left hemihepatectomy combined with right hemicolectomy for liver tumor and hemorrhagic diverticulosis. *Surg Endosc.* 2003;17:158–159.
12. Leung KL, Lee JF, Yiu RY, et al. Simultaneous laparoscopic resection of rectal cancer and liver metastasis. *J Laparoendosc Adv Surg Tech.* 2006;16:486–488.
13. Law WL, Fan JK, Poon JT, et al. Laparoscopic bowel resection in the setting of metastatic colorectal cancer. *Ann Surg Oncol.* 2008;15:1424–1428.
14. Bretagnol F, Hatwell C, Farges O, et al. Benefit of laparoscopy for rectal resection in patients operated simultaneously for synchronous liver metastases: preliminary experience. *Surgery.* 2008;144:436–441.
15. Kim SH, Lim SB, Ha YH, et al. Laparoscopic-assisted combined colon and liver resection for primary colorectal cancer with synchronous liver metastases: initial experience. *World J Surg.* 2008;32:2701–2706.
16. Sasaki A, Nitta H, Otsuka K, et al. Ten-year experience of totally laparoscopic liver resection in a single institution. *Br J Surg.* 2009;96:274–279.
17. Vibert E, Perniceni T, Levard H et al. Laparoscopic liver resection. *Br J Surg.* 2006;93:67–72.